

### ABSTRACT

A method and system for acquiring a time division multiplexed synchronization signal in a satellite communication system is provided. The signal is provided as a series of frames with beacon signals time division multiplexed into at least one time slot of each frame. The beacon signal in each frame comprises a unique word sequence, which is the same in each frame, and a portion of a PN sequence. The entire PN sequence is distributed into a plurality of frames forming a superframe. Initially, the power level of the incoming signal is determined by locating the maximum power received in half time slot intervals. Next a series of frames are correlated against the expected unique word, each at one of a plurality of possible frequencies. The frequency generating the maximum correlation with the unique word is selected. The frequency is fine tuned by comparing the actual arrival time of the unique word in each frame with the estimated arrival time based on the current frequency, and adjusting the frequency accordingly. Also, the start of the superframe is located by correlating the PN sequence portion of each beacon signal against a known PN sequence until a match is found. Once the frequency offset is reduced below a threshold value, and the start of the PN sequence of the incoming signal is located, acquisition is completed.

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